

BOTANICAL REPORT - FERMILAB (2001)

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New Species

During the 2001 growing season one new native plant has been found at Fermilab. This was the long-leaved pondweed (*Potamogeton nodosus*) found in the ditch-pond between Kautz Road and the Mitigation Area. It was probably introduced by a transient waterfowl.

With this additional species, there are now 260 native prairie and prairie marsh species along with 195 species of native trees, shrubs, and woodland flowers for a total of 455 native species found at Fermilab.

In addition, there are 168 non-native (exotic) herbaceous weeds and 30 species of non-native trees and shrubs for a total of 198 exotic species found at Fermilab for a grand total of 653 species.

CHANGES IN SPECIES POPULATIONS

CHANGES IN THE PRAIRIE

First Stage Prairie Species

A number of First Stage species that were originally not very common are beginning to increase in population. This is especially true in all plots of ELM-1 (1-11,13); ELM-4 (13); 25 (16,16B,17,18); and 28 (CA-2).

Examples of some of these species are: nodding wild onion (*Allium cernuum*), round-headed bush clover (*Lespedeza capitata*), wild quinine (*Parthenium integrifolium*), early goldenrod (*Solidago juncea*) and purple meadow rue (*Thalictrum dasycarpum*), and spiderwort (*Tradescantia ohioensis*).

However, on the other hand, many First Stage species that were very common during earlier periods of the restoration are now decreasing in population. Some examples of these species are: tall coreopsis (*Coreopsis tripteris*); showy tick-trefoil (*Desmodium canadense*); yellow coneflower (*Ratibida pinnata*); black-eyed Susan (*Rudbeckia hirta*); rosin weed (*Silphium integrifolium*); and Indian grass (*Sorghastrum nutans*).

Second Stage Prairie Species

Second Stage species are continuing to slowly increase their populations throughout many of the same tracts which are also showing increases in later First Stage Species.

Examples of some these Second Stage species are: heath aster (*Aster ericoides*), Bicknell's sedge (prairie sedge), prairie coreopsis (*Coreopsis palmata*), false toadflax (*Comandra richardsonii*), yellow gentian (*Gentiana flavida*), stiff gentian (*Gentiana quinquefolia*), false dragonhead (*Physostegia virginiana*), blue eyed grass (*Sisyrinchium albidum*), which is not a grass but a relative of the Iris, and Culver's root (*Veronicastrum virginicum*).

Third & Fourth Stage Prairie Species

Scattered specimens of both Third & Fourth Second Stage are now beginning to appear chiefly in the same foci (advanced successional pockets) usually in the same areas populated by late First Stage and early Second Stage species.

Third stage species that appears to be increasing are lead plant (*Amorpha canescens*), prairie panic grass (*Panicum leibergii*), and yellow star-grass (*Hypoxis hirsuta*), which like the blue-eyed grass, is not a grass, but a relative of the Amaryllis.

CHANGES IN THE WET PRAIRIE & MARSHES

Species of both the wet prairies and marshes continue to show increases in populations. Examples are: false aster (*Boltonia latisquama recognita*), yellow fox sedge (*Carex annectens*), crested oval sedge (*C. cristatella*), marsh fleabane (*Erigeron philadelphicus*), marsh betony (*Pedicularis lanceolata*), prairie cord grass (*Spartina pectinata*), and golden Alexanders (*Zizia aurea*).

TABLE 1 **NEW SPECIES FOR PRAIRIE & MARSH TRACTS**

Allium cernuum (wild onion)--ELM 25 (Plots 16,16B)
Anemone canadensis (meadow anemone)--ELM 1 (4,6)
Anemone cylindrica (thimbleweed)--ELM 25(16B)
Apocynum sibiricum (Indian hemp)--ELM 25 (21)
Asclepias verticillata (whorled milkweed)--ELM 28 (CA2)
Aster ericoides (heath aster)--ELM 1(1), ELM 25(18), ELM 4(19)
Aster laevis (smooth aster)--ELM 1 (4)
Aster novae-angliae (New-England aster)--ELM 25 (18)
Aster simplex (panicled aster)--ELM 4 (19)
Baptisia leucantha (white wild indigo)--ELM 1 (13)
Boltonia latisquama recognita (false aster)--ELM 25 (14)
Carex annectens xanthocarpa (sedge)--ELM 4 (19)
Carex bicknellii (prairie sedge)--ELM 1 (3,4)
Carex cristatella (sedge)--ELM 1 (7)
Cassia fasciculata (partridge pea)--ELM 25 (16B)
Cicuta maculata (water hemlock)--ELM 1 (4)
Comandra umbellata (false toadflax)--1 (6), 25 (15,16B)
Coreopsis palmata (prairie coreopsis)--ELM 1 (9), ELM 25 (16B)
Coreopsis tripteris (tall coreopsis)--ELM 4 (19)
Cyperus esculentus (field nut sedge)--ELM 25 (14)
Dodecatheon meadia (shooting stars)--ELM 1 (3,4)
Epilobium coloratum (cinnamon willow herb)--ELM 25 (16)
Erigeron philadelphicus (marsh fleabane)--ELM 1 (4,7), ELM 25 (17)
Erigeron strigosus (daisy fleabane)--ELM 28 (CA2)
Enyngium yuccifolium (rattlesnake master)--ELM 4 (19)
Eupatorium serotinum (late-flowering boneset)--ELM 25 (16)
Galium boreale (northern bedstraw)--ELM 1 (4)
Gaura biennis (biennial gaura)--ELM 25 (16B,17)
Gentiana andrewsii (bottle gentian)--ELM 1 (9)
Gentiana flavida (yellow gentian)--ELM 1 (4), ELM 25 (16B)
Gentiana quinquefolia occidentalis (stiff gentian)--ELM 1 (10)

Helianthus mollis (downy sunflower)--4 (19)
Heuchera richardsonii grayana (alum root)--ELM 1 (4)
Hypoxis hirsuta (yellow star-grass)--ELM 1 (13), 25 (17)
Juncus dudleyi (Dudley's rush)--ELM 4 (19)
Juncus torreyi (Torrey's rush)--ELM 4 (19)
Krigia biflora (false dandelion)--ELM 1 (9)
Lernaea oryzoides (rice cut grass)--ELM 1 (10)
Lespedeza capitata (round-headed bushclover)--ELM 25 (16B)
Liatris aspera (rough blazing star)--ELM 25 (16B)
Liatris pycnostachya (prairie blazing star)--ELM 28 (CA2)
Liatris spicata (marsh blazing star)--ELM 25 (16B)
Lilium philadelphicum andinum (prairie lily)--ELM 1 (4)
Lobelia spicata (pale-spiked lobelia)--ELM 25 (16B)
Lythrum alatum (winged loosestrife)--ELM 4 (19)
Mimulus ringens (monkey flower)--ELM 4 (19)
Oenothera pilosella (prairie sundrops)--ELM 1 (4)
Oxypolis rigidior (cowbane)--ELM 1 (9)
Panicum leibergii (prairie panic grass)--ELM 1 (1,12); ELM 25 (15,16B)
Panicum virgatum (switch grass)--ELM 25 (18); ELM 4 (19)
Parthenium integrifolium (wild quinine)--ELM 25 (18)
Pedicularis canadensis (prairie betony)--ELM 25 (16)
Pedicularis lanceolata (marsh betony)--ELM 1 (4)
Penstemon calycosus (smooth beard tongue)--ELM 4 (19)
Penstemon digitalis (Foxglove beard tongue)--ELM 25 (14,15,16,17,18); ELM 4 (19); ELM 28 (CA2)
Penthorum sedoides (ditch stonecrop)--ELM 25 (14)
Phlox glaberrima interior (marsh phlox)--ELM 1 (4,11)
Phlox pilosa (prairie phlox)--ELM 1 (9)
Polygala senega (Seneca snakeroot)--ELM 1 (1,6); ELM 25 (15)
Potentilla simplex (common cinquefoil)--ELM 25 (16)
Prenanthes racemosa (glaucous white lettuce)--ELM 25 (15)
Prunella vulgaris lanceolata (self-heal)--ELM 4 (19)
Pycnanthemum tenuifolium (slender mountain mint)--ELM 1 (6,8)
Pycnanthemum virginianum (common mountain mint)--ELM 28 (CA2)

Rorippa palustris (marsh cress)--ELM 25 (16)
Rosa carolina (wild rose)--ELM 25 (17)
Rudbeckia subtomentosa (sweet black-eyed Susan)--ELM 25 (16B); ELM 4 (19)
Scirpus atrovirens (dark-green rush)--ELM 1 (8)
Senecio pauperculus balsamitae (balsam ragwort)--ELM 1 (9)
Silphium integrifolium (rosin weed)--ELM 4 (19)
Silphium laciniatum (compass plant)--ELM 4 (19)
Silphium perfoliatum (cup plant)--ELM 1 (8)
Silphium terebinthinaceum (prairie dock)--ELM 4 (19)
Sisyrinchium albidum (blue-eyed grass)--ELM 1 (4,9); ELM 25 (16B,17)
Solidago graminifolia (grass-leaved goldenrod)--ELM 4 (19)
Solidago juncea (early goldenrod)--ELM 25 (16); ELM 28 (CA-2)
Solidago rigida (still goldenrod)--ELM 1 (8); ELM 4 (19)
Sorghastrum nutans (Indian grass)--ELM 4 (19)
Spartina pectinata (prairie cord-grass)--ELM 25 (16)
Stachys palustris homotricha (woundwort)--ELM 26 (12)

Stachys tenuifolia (smooth hedge nettle)--ELM 25 (15)
 Thalictrum dasycarpum (purple meadow rue)--ELM 25 (17); ELM 28 (CA2)
 Tradescantia ohiensis (common spiderwort)--ELM 1 (3); ELM 16 (16)
 Verbena hastata (hoary vervain)--ELM 4 (19)
 Veronicastrum virginicum (Culver's root)--ELM 28 (CA2)
 Vernonia fasciculata (common ironweed)--ELM 1 (10)
 Zizia aurea (golden Alexanders)--ELM 4 (19)

TABLE 2

The tracts showing the highest number of new species for the 2001 Season are the following:

<u>ELM</u>	<u>Tract #</u>	<u>Number of New Species</u>
25	16B	10
25	16	9
4	19	7
28	CA2	7
25	17	5
25	18	5

CHANGES IN THE WOODLANDS

Woodland wildflowers are continuing to recover from the heavy grazing resulting from the overpopulation of deer that occurred a few years ago. Some species recorded for the first time were: the one-flowered broom rape (*Orobanche uniflora*), which has no chlorophyll and is often a parasite on oaks (*Quercus sp.*) in the Big Woods (ELM-24); black walnut (*Juglans nigra*) in the Owl Nest Woods (ELM-14); American gromwell (*Lithospermum latifolium*) in Morgan Woods (ELM-25); and wood sandwort (*Arenaria lateriflora*) in Pine Street Woods (ELM-25).

TABLE 3
NEW SPECIES IN WOODLANDS

Arenaria latiflora (wood sandwort)--Big Woods, Pine Street Woods
Carya cordiformis (bitternut hicklory)--Morgan Woods
Fraxinus pennsylvanica subintegerrima (green ash)--Morgan Woods
Juglans nigra (black walnut)--Owl Nest Woods
Lithospermum latifolium (American gromwell)--Morgan Woods
Quercus alba (white oak)--Morgan Woods
Quercus macrocarpa (bur oak)--Morgan Woods
Rhus radicans (poison ivy)--Owl Nest Woods
Smilacina stellata false Solomons's seal)--Big Woods
Ulmus americana (American elm)--Morgan Woods

Weed Problems

As the native natural communities at Fermilab move toward later ecological stages, resulting in heavier competition from both prairie and woodland species, it is less likely that weeds will pose much of problem.

However, in areas continually being disturbed by cultivation, diggings, compaction of soil by heavy machinery, movement of soil from one place to another, salting of highways, etc., weeds will find a sanctuary.

The Roads & Grounds Department have done an admirable job in controlling the cut-leaved teasel (*Dipsacus laciniatus*) along roads and the purple loosestrife (*Lythrum salicaria*) in the marsh and wet areas.

The nodding thistle (*Carduus nutans*), which threatened to be a pest in the past along roads, has apparently disappeared from the lab.

The common reed (*Phragmites australis*) continues its slow inexorable invasion of roadside ditches, resulting in the slow extermination of the two native cattails (*Typha angustifolia* and *T. latifolia*).

The salt-meadow grass (*Diplachne acuminata*) is common along roadside edges throughout the laboratory. It is an annual halophytic grass invader from the western states that is tolerant of saline habitats, such as that occurring along roadsides. It is not a problem since it does not invade non-saline habitats and can be easily mowed.

Populations of the obnoxious non-native garlic mustard (*Alliaria petiolata*) are falling in the woodlands. This appears to be due in part (1) to its sensitivity to woodland fires and (2) the increased competition from the native woodland flora resulting from frequent burning of these woodlands.

In the woodlands, exotic shrubs, such as, the Amur honeysuckle (*Lonicera maackii*), and common buckthorn (*Rhamnus cathartica*), are being closely monitored and promptly removed when found.

SEED PRODUCTION

Cross-Pollination

Cross-pollination of the two prairie lilies the prairie lily (*Lilium philadelphicum andinum*) and Turk's cap lily (*L. michiganense*), which began last season was continued this season. A fair number of seed pods were collected from the prairie lily; none from the Turk's cap.

Seed Production in the White Wild Indigo

It is interesting to note that for a number of years the White Wild Indigo (*Baptisia leucantha*) almost never produced pods due to the heavy browsing of its flowers by deer. When deer were reduced in numbers, the species again began to produce pods, with a banner-year occurring during the 2000 Season.

This year pod production was almost non-existent. One reason for this may have been the expenditure of food reserves required to produce such a large crop of pods last year.

SEED COLLECTION

Collections at Fermilab

As in past years, group seed collecting was carried out on the last Saturdays in September and October. Due to tight security, the number of participants this year were reduced from former years. Surprisingly, in spite of the low attendance, relatively large amounts of seed were collected.

Collections at Local Prairie Remnants

About a half-dozen collecting trips were made to a number of local prairie remnants to collect seeds of Second and Third Stage species.

Seed Exchange

Seed of later successional stages was also obtained from local Forest Preserve Districts, such as Kane and Will Counties, in exchange for harvested seed of early successional stages at Fermilab.

TABLE 4 **SEED COLLECTED OR TRADED FOR**

Prairie & Marsh

Allium canadense (wild onion)
Allium cernuum (nodding wild onion)
Amorpha canescens (lead plant)
Andropogon scoparius (little blue-stem grass)
Anemone canadense (meadow anemone)
Anemone cylindrica (thimbleweed)
Asclepias incarnata (marsh milkweed)
Asclepias sullivantii (Sullivant's milkweed)
Aster azureus (sky-blue aster)
Aster ericoides (heath aster)
Aster laevis (smooth blue aster)
Aster novae-angliae (New England)
Baptisia leucantha (white wild indigo)
Cacalia plantaginea (prairie Indian plantain)
Carex bicknellii (Bicknell's sedge)
Cassia fasciculata (partridge pea)
Comandra umbellata (false toadflax)
Coreopsis palmata (prairie coreopsis)
Coreopsis tripteris (tall coreopsis)
Desmodium illinoense (Illinois tick-trefoil)
Dodecatheon meadia (shooting stars)
Echinacea pallida (purple prairie clover)
Eryngium yuccifolium (rattlesnake master)
Euphorbia corollata (flowering spurge)
Galium boreale (Northern bedstraw)
Galium obtusum (wild madder)
Gentiana andrewsii (bottle gentian)
Gentiana flavida (yellow gentian)
Gentiana puberulenta (prairie gentian)
Gentiana quinquefolia (stiff gentian)
Helianthus rigidus (prairie sunflower)
Heliopsis helianthoides (false sunflower)
Heuchera richardsonii (prairie alum root)
Hypoxis hirsuta (yellow star-grass)
Lespedeza capitata (round-headed bushclover)
Liatris aspera (button blazing star)

Liatris pycnostachya (prairie blazing star)
Liatris spicata (marsh blazing star)
Lilium philadelphicum andinum (prairie lily)
Lobelia spicata (pale-spiked lobelia)
Lysimachia quadriflora (narrow-leaved loosestrife)
Monarda fistulosa (wild bergamot)
Oxypolis rigidior (cowbane)
Panicum leidbergii (prairie panic grass)
Parthenium integrifolium (wild quinine)
Pedicularis canadensis (prairie betony)
Penstemon calycosus/digitalis (smooth & foxglove beard tongue)
Petalostemum candidum (white prairie clover)
Petalostemum purpureum (purple prairie clover)
Phlox glaberrima interior (marsh phlox)
Phlox pilosa (prairie phlox)
Physostegia virginiana (false dragonhead)
Polygala senega (Seneca snakeroot)
Prenanthes racemosa (glaucous white lettuce)
Pycnanthemum tenuifolium (slender mountain mint)
Ratibida pinnata (yellow coneflower)
Rudbeckia subtomentosa (sweet black-eyed Susan)
Silphium laciniatum (prairie compass plant)
Silphium terebinthinaceum (prairie dock)
Sisyrinchium albidum (blue eyed-grass)
Solidago rigida (stiff goldenrod)
Solidago riddellii (Riddell's goldenrod)
Sporobolus heterolepis (prairie dropseed grass)
Stipa spartea (porcupine grass)
Thalictrum revolutum (waxy meadow rue)
Tradescantia ohiensis (common spider-wort)
Verbena hastata (blue vervain)
Veronicastrum virginicum (Culver's root)
Ziziz aurea (golden Alexanders)

Mixtures

Angelica atropurpurea (great angelica) with an assortment of other marsh and fen plants, such as rushes, sedges, etc.

Savanna & Woodland

Elymus villosus (silky wild rye)
Heracleum maximum (cow parsnip)
Hydrastis canadensis (golden seal)
Lithopermum latifolium (broad-leaved puccoon)
Trillium grandiflorum (large-flowered trillium)
Uvularia grandiflora (bellwort)

COMMENTS

Effects of the Burning Moratorium on the Prairie

Without a doubt the moratorium on prairie burning has had a negative effect on the prairie restoration project here at Fermilab. It is probable that the accumulation of a blanket of organic matter has stifled the growth of both young plants and seedlings from enrichment plantings because of the inability to capture sunlight necessary for their photosynthetic processes.

Hopefully, the damage has not been too severe as to kill the young plants. With the renewal of prairie burning the tracts can again progress forward to the climax prairie vegetation.

Effect of the Burning Moratorium on Woodlands

It would appear that the damage to the woodlands by the lack of fire has not been as severe as that on the prairie. With renewed woodland burning the woodland ground-cover can continue its movement toward a climax and the suppression of exotic weed species, such as the garlic mustard.

Renewed burning will also efforts to restore the presettlement oak forests which were scattered throughout the prairie landscape. Sporadic woodland burns are important in preventing the dominance of sugar maple (*Acer saccharum*), which because of its tendency to produce a dense shading, causes the demise of young oak seedlings, such as, the white (*Quercus alba*), red (*Q. rubra*), and bur oaks (*Q. macrocarpa*) that required more sunlight. Woodland ground fires are especially more damaging to the thin-barked sugar maple saplings, than the thicker-barked oak saplings.